

Fairfax County will expand the existing transfer station to handle additional MSW requirements.

SWMP Actions

Table 6-12 shows the City's SWMP actions for the transfer of MSW. The City selected SWMP actions based on their alignment with the SWMP objectives (in Chapter 4) and their ability to close the gaps between the City's current SWM system and that required in the future. These SWMP actions are discussed in more detailed in Chapter 10.

Table 6-12. City of Falls Church MSW Transfer SWMP Actions

MSW Transfer SWMP Actions
– Continue using the current transfer system

Disposal

The City of Falls Church currently uses Fairfax County's E/RRF as its primary disposal method for MSW.

"For every one million tons of refuse processed at our facilities, we offset the need to use about 1.67 million barrels of oil to generate the same amount of electricity. That also means offsetting the emissions that the oil would have created. In addition, because the process reduces the volume of refuse, we conserve valuable landfill space."

Current Programs

The City of Falls Church uses the Fairfax County disposal system as its primary disposal method for MSW. Fairfax County currently uses the I-95 Energy/Resource Recovery Facility (E/RRF) for disposal of MSW, with out-of-county sanitary landfills to handle the "overflow" waste from the E/RRF. When MSW quantities in the county exceed the capacity of the E/RRF, the county diverts some trucks from the transfer station to out-of-county landfills rather than to the E/RRF. The county disposes of the ash generated from the E/RRF in the Area 3 Ash Landfill at the I-95 Landfill Complex.

Energy Resource Recovery Facility



The E/RRF is one of the largest "mass burn" waste-to-energy (WTE) facilities in the United States. It is located at the I-95 Landfill (which is presently used for ash disposal only). Covanta Fairfax, Inc. (CFI), a private firm, owns and operates the E/RRF under a long-term service agreement with the county.

Fairfax County endorsed the construction of a WTE facility in the mid-1980s to prolong the life of the I-95 Landfill and to provide a viable longer-term solid waste management alternative to landfilling for waste generated in the county. The construction of the E/RRF began in 1988 and operations commenced in June 1990.

Operating the E/RRF is an environmentally effective and economically efficient means to dispose of MSW. The current business model allows the county to charge a competitive MSW disposal fee for contract haulers. The tip fees paid to CFI are used to pay the bonds that financed the construction of the E/RRF. The capital cost of the facility, not including financing charges, underwriting fees, and construction of utilities was \$195 million. The bonds were refinanced in 1998 and will be completely paid in 2011.

The E/RRF reduces the volume of solid waste by 90 percent. The byproducts of the combustion process, bottom and fly ash, are typically less than 28 percent by weight of the incoming refuse processed. In 2003, ash residue was 24.9 percent by weight of waste combusted.

The E/RRF uses the waste to generate up to 91 megawatts of electricity; 11 megawatts are required to operate the facility and roughly 80 MW are sold to Virginia Power. This electricity powers about 70,000 homes in the area.

The facility also recovers and recycles ferrous and nonferrous metals; in 2003, 22,204 tons of ferrous metals and 318 tons of nonferrous metals were recovered, representing 2.5 percent of the total municipal waste combusted.

The E/RRF reduces disposal volume, recycles metal, generates electricity, and reduces landfill waste management concerns (leachate, capping, etc.) at a cost that is comparable with landfilling.

To limit the escape of odors from the process, the E/RRF building structure containing the receiving area, refuse storage pit, cranes, and hoppers is maintained at less than atmospheric pressure and a misting system near the doors is employed to reduce odors.



Steam from waste combustion is routed to two steam turbine-generators for power generation. A two-turbine design allows for improved reliability: the facility can continue to produce electricity in case one turbine is off-line for maintenance.

The E/RRF operates using mass burn technology, which involves the combustion of minimally processed or non-processed refuse. The facility is constructed with four 750-ton-per-day waterwall furnaces, each designed to operate independently. The facility design allows for the construction of a fifth furnace, if needed and permitted for future operations.

Pollution Control Equipment

The E/RRF is equipped with state-of-the-art pollution prevention technology.

The E/RRF manages many factors to maximize the combustion of the solid waste and to control the generation of byproducts, including boiler temperature, residence time in the boiler, and underfire and overfire air supply. For example, overfire air (air delivered to the boilers above the feed table) assists in maintaining boiler temperatures between 1,800°F and 2000°F to ensure complete combustion of organic gases and carbon monoxide.

Air pollution equipment for each boiler unit consists of a semi-dry acid gas scrubber, carbon injection system, aqueous ammonia injection system, and fabric filter baghouse. In the scrubbers, atomized lime is sprayed into the flue gas stream to react with and neutralize acid gases (primarily sulfur dioxide and hydrogen chloride). The carbon injection system assists in the removal of mercury, and the aqueous ammonia injection system assists in controlling emissions of nitrous oxides. A new system of inserting dolomitic lime into the ash further conditions the ash and binds heavy metals, such as lead and cadmium, to the ash residue, preventing the metals from leaching out once the ash is landfilled. The dolomitic lime system ensures that the pH of the ash remains between 8.0 and 11.0.

Particulate matter is removed from the flue gas stream by the baghouses. Each baghouse contains 2,520 bags: 12 compartments of 210 bags each. The baghouses are designed for full operation using 10 of the 12 compartments. The baghouses are over 99.9 percent effective in removing particulate matter. Fly ash from the air pollution control equipment is directed to the ash discharger (explained above) for quenching.

Continuous emissions monitors located in the stack flues record emissions of carbon monoxide, sulfur dioxide, nitrogen oxides, opacity (a measure of particulate matter), and oxygen.

Because of the continuous monitoring of all the gases and ash leaving the facility and the application of state-of-the-art pollution prevention technology, the facility remains in compliance with EPA and VDEQ permits and guidelines.

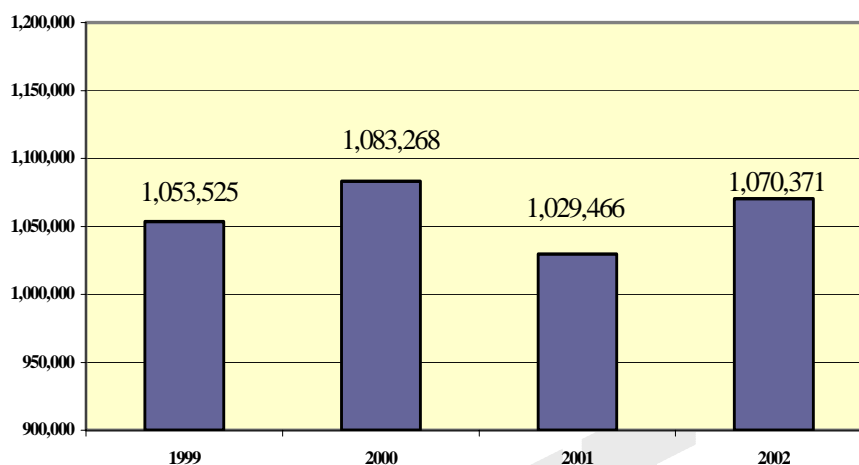
Past and Present Rate of Use

The E/RRF operates 24 hours per day and 365 days per year. The facility burns waste mostly from Fairfax County, but also takes limited amounts of waste from other jurisdictions (including the City of Falls Church) as part of waste exchange or longstanding agreements. Figure 6-5 shows the tons of waste processed by the E/RRF between 1999 and 2002.

Recent air monitoring data confirmed the following percent removals:

Sulfur Dioxide—94.5%
Hydrogen Chloride—98.2%
Mercury—93.4%
Nitrous Oxides—45%.

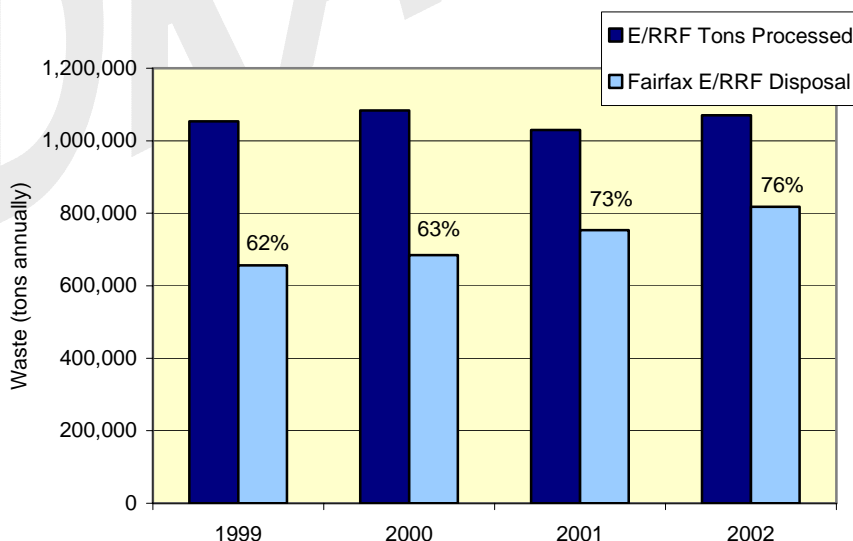
Figure 6-5. E/RRF, Tons of Waste Processed, 1999-2002



Fairfax County must provide a contracted amount of solid waste (930,750 tons per year) to the E/RRF, referred to as the Guaranteed Annual Tonnage (GAT).

Fairfax County must provide a contracted amount of solid waste (930,750 tons per year) to the E/RRF. As a result, Fairfax County has developed agreements and waste exchanges with other jurisdictions (including the City of Falls Church) to accept MSW for disposal at the E/RRF. As presented in Figure 6-6, county-generated waste constituted between 62 and 76 percent of the waste processed by the facility from 1999 to 2002.

Figure 6-6. Fairfax County Portion of Waste Combusted at E/RRF, 1999-2002



Capacity and Availability

The E/RRF processing capacity is roughly 3,000 tons per day, with 15,000 tons of storage capacity.

The E/RRF storage capacity is approximately 15,000 tons in the refuse storage pit, which is equivalent to 5 days of continuous processing. E/RRF processing capacity is 3,000 tons per day of solid waste. If waste that requires processing by the facility exceeds this amount, other waste disposal options may be required.

Operation of the E/RRF requires sufficient waste quantities to continuously feed the boilers. Fairfax County must manage MSW collection and disposal in order to keep the boilers operational. Fluctuations in waste volumes or temporary interruptions in waste collection (such as snow events or power outages) can shut down one or more boilers in the E/RRF and reduce the facility's operating capacity.

E/RRF Inventory Management

Fairfax County manages the disposal of all MSW generated in the City of Falls Church. Fairfax County's primary emergency backups for the E/RRF are out-of-county landfills. The Area 3 Ash Landfill at the I-95 Landfill Complex is permitted to accept MSW in case of an emergency shutdown of the E/RRF. The landfill was closed to MSW in 1995; the ash landfill is not a viable long-term disposal option for Fairfax County when waste generation exceeds the processing capacity of the E/RRF.



Fairfax County uses out-of-county landfills to handle E/RRF overflow waste.

The primary option to handle "overflow" waste from the E/RRF is to transport MSW to one of the contracted landfills outside of the county. Most of these have sufficient capacity to handle the current out-of-county landfill requirements over the next 20 years. Some, however, have quarterly permit limits that cap the MSW quantity accepted. Although these landfills may have sufficient capacity, they may not be available to accept MSW from the county in the quantities that are needed daily.

(See the "Sanitary (MSW) Landfills" section of this chapter for the annual tonnage, estimated years remaining, distance from the I-66 Transfer Station, and daily tonnage capacity of the largest private landfills in Virginia.)

Existing Contracts with Haulers and Municipalities

- CFI and the county currently have a 20-year operating agreement, with the county guaranteeing at least 930,750 tons of waste each year to the facility until 2011. Fairfax County uses the I-66 Transfer Station and contracts with collection and disposal companies and local jurisdictions to manage the quantities of waste delivered to the E/RRF.

Remaining Useful Life and Closure Requirements

Typically, WTE facilities similar to the E/RRF have a useful life of approximately 40 years. Therefore, the E/RRF should not exceed its remaining useful life during the SWMP planning period. CFI owns the facility and operates it, with oversight of the Fairfax County Solid Waste

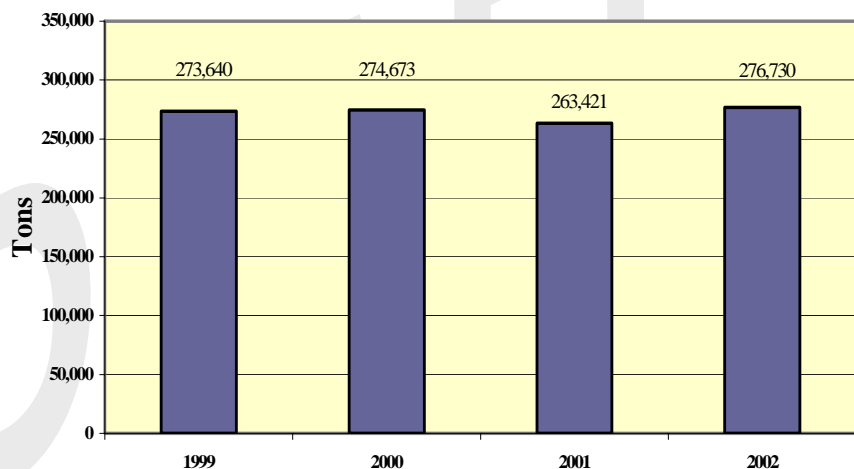
Authority until the bonds are repaid in 2011. After that date, CFI is projected to remain in the current location until their lease on the E/RRF property expires in 2032.

Ash Disposal Plans

Ash from the E/RRF is disposed of at the nearby Area 3 Ash Landfill.

Ash generated at the E/RRF is hauled to the nearby landfill (referred to as the Area 3 Ash Landfill) for disposal. Fairfax County disposes of approximately 760 tons of ash from the E/RRF in the landfill daily. Figure 6-7 shows the tons of ash generated by the E/RRF in 1999 through 2002 and disposed of at the Area 3 Ash Landfill. (The “Area 3 Ash Landfill” section of this chapter contains more information about the operations of the ash landfill.)

Figure 6-7. E/RRF, Tons of Ash Generated, FY 1997–2003



The ash produced in the E/RRF comprises a number of residues. Collected ash is cooled and then passed through a “scalper screen,” which removes pieces larger than 10 inches. After this initial screening, ferrous and nonferrous metals are removed for sale (see the next subsection). The remaining ash is loaded into trucks for ultimate disposal at the Area 3 Ash Landfill.

Recovery and Sale of Metals

Ash and material that pass through the initial screen (described above) are fed by a conveyor to a rotating magnetic trommel, where ferrous metal is removed. Next, a rotating magnet recovers smaller ferrous metals that were not collected in the initial trommel. The ash then passes through a screen and eddy current separator, where brass, aluminum, copper, and other nonferrous metals are recovered. The recovered metals are stored in the ash building and sold to scrap recyclers. In

2003, 22,204 tons of ferrous metals and 318 tons of non-ferrous metals were recycled.

Hazardous Materials

The E/RRF screens delivered materials to prevent burning unacceptable waste, including hazardous waste.

To prevent processing unacceptable waste, including hazardous waste, the facility has a screening program for delivered materials. Notices are posted at the point of entry to the facility, and trucks entering the facility are visually inspected.

The tipping floor manager visually inspects all loads for unusual physical properties; tipping floor screening procedures also include random checks of vehicles before unloading the waste. The tipping floor and crane personnel also visually observe the refuse after it is deposited in the pit.

The county is also in the process of designing and installing radiation detection equipment to identify and remove any radioactive material that may be brought for disposal.

Air Emissions

The E/RRF air permit includes emission limits for sulfur dioxide, carbon monoxide, nitrous oxides, hydrochloric acid, particulate matter, dioxin/furans, and mercury. The facility consistently meets its emission limits. Table 6-13 shows 2003 emission testing results.

Table 6-13. Results of June 2003 Emissions Testing at the E/RRF

Parameter	Permit limit	Average E/RRF result
Sulfur dioxide	29 ppm, or	8.8 ppm
	75% reduction	
Carbon monoxide	100 ppm	9 ppm
Nitrous oxides	206.3 pph	193 pph
Hydrochloric acid	29 ppm, or	3.9275 ppm
	95% reduction	
Particulate matter	27 mg/dscm	5.1575 mg/dscm
Dioxin/furans	30 ng/dscm	.688 ng/dscm
Mercury	80 ng/dscm, or	1.39125 ng/dscm
	85% reduction	

Note: ppm = parts per million; pph = pounds per hour; mg = milligram; ng = nanogram; dscm = dry standard cubic meter.